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ABSTRACT

Designed to develop creativity in young learners, this book contains interdisciplinary activities which focus on the theme of the weather. Activity pages are provided that can serve as front and back covers of a student booklet and the suggested activities can be duplicated for insertion between the covers resulting in a booklet for each student. A teacher/parent guide is included and supplies background information, activity descriptions, materials needed, and possible answers for the activities. A variety of exercises are provided on topics such as: (1) weather patterns; (2) weather sayings and lore; (3) major weather records; (4) water cycle; (5) cloud types; (6) wind scales; (7) hurricane names; (8) weather predictions; (9) weather stations; and (10) feelings and weather. (ML)

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GOOD GA APPLE

YOUNG SCIENTISTS EXPLORE

The Weather

BOOK 5 INTERMEDIATE LEVEL

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YOUNG SCIENTISTS EXPLORE

THE WEATHER

Book 5 -- Intermediate Level
by **Jerry DeBruin**

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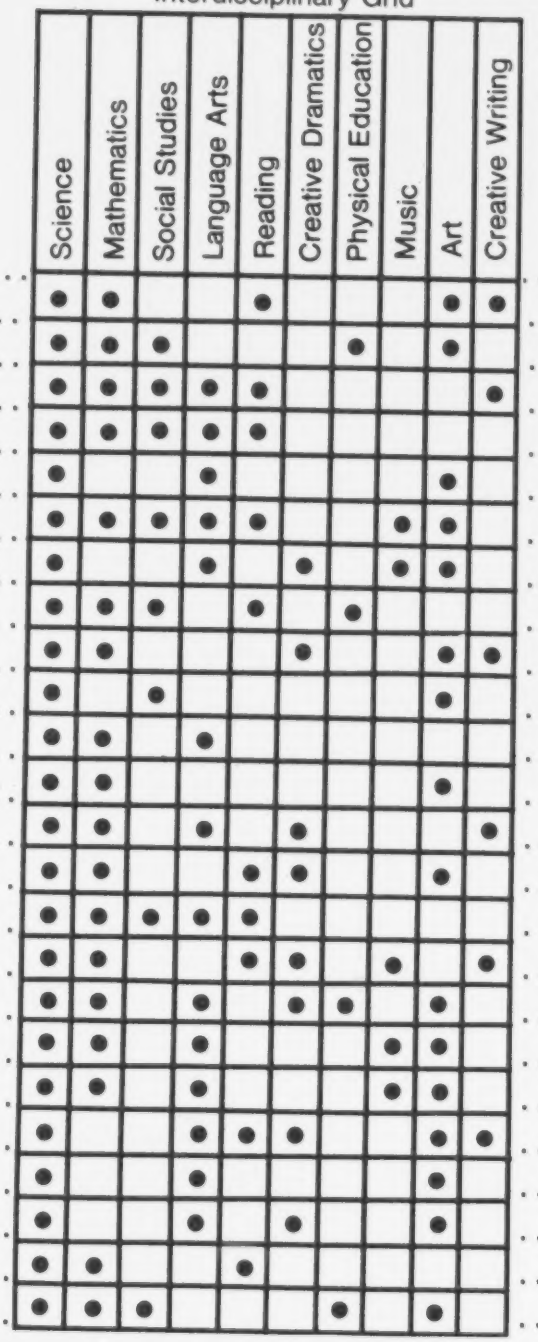

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Illustrated by Charlene Czerniak cover design by Tom Sjoerdsma

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PREFACE

A NOTE TO TEACHERS AND PARENTS

Dear Friends,

Thank you for the many kind comments about my previous book, *Creative, Hands-On Science Experiences* (CHOSE) published by Good Apple, Inc., in 1980.

This book, *Young Scientists Explore the Weather,* is written as a result of your comments and suggestions; comments that suggested a need for a handy science book or series of books that contain activity sheets which could be duplicated for students' use. *Young Scientists Explore the Weather* is an attempt to meet this need.

Young Scientists Explore the Weather is the fifth in a series of books that feature science activity sheets which provide youngsters with a variety of interesting and challenging science-related experiences using puzzles, cutouts, hidden pictures, grids, charts, and seek-a-words. Youngsters are encouraged to gain firsthand experience before doing the written activities, for it is through firsthand experience that meaningful learning occurs. Emphasis throughout the book is placed on the development of creativity in the learner. It is hoped that this creativity will be nurtured both during and after the activities are done.

You as teachers and parents who use *Young Scientists Explore the Weather* are encouraged to make duplicating masters and transparencies from its pages. The activities are interdisciplinary and nonsequential in nature and are meant to integrate and extend existing science instruction with other academic areas. To achieve this purpose, the book contains a Teacher/Parent Guide that supplies background information including the title, major concept and materials needed for each activity plus a brief description of how to teach the activity and possible answers. When completed and mounted on single-layered cardboard and bound with tape, activity sheets 1 and 23 make up both the front and back covers of the Student Booklet. Completed student activity sheets can then be inserted between these covers with the result being a permanent booklet for each youngster.

It is hoped that these activity sheets will touch many minds, hearts and hands and that much personal growth is experienced by all who do the activities. Keep in touch. Let me know how you are doing. It is always good to hear from you. Until then, best wishes in your continued growth as a scientist and complete human being.

Sincerely,

Jerry DeBruin

Directions: Use this handy weather record to record weather happenings for at least one month. You'll need four of these to finish your task.

WEEK NUMBER _____ NAME _____

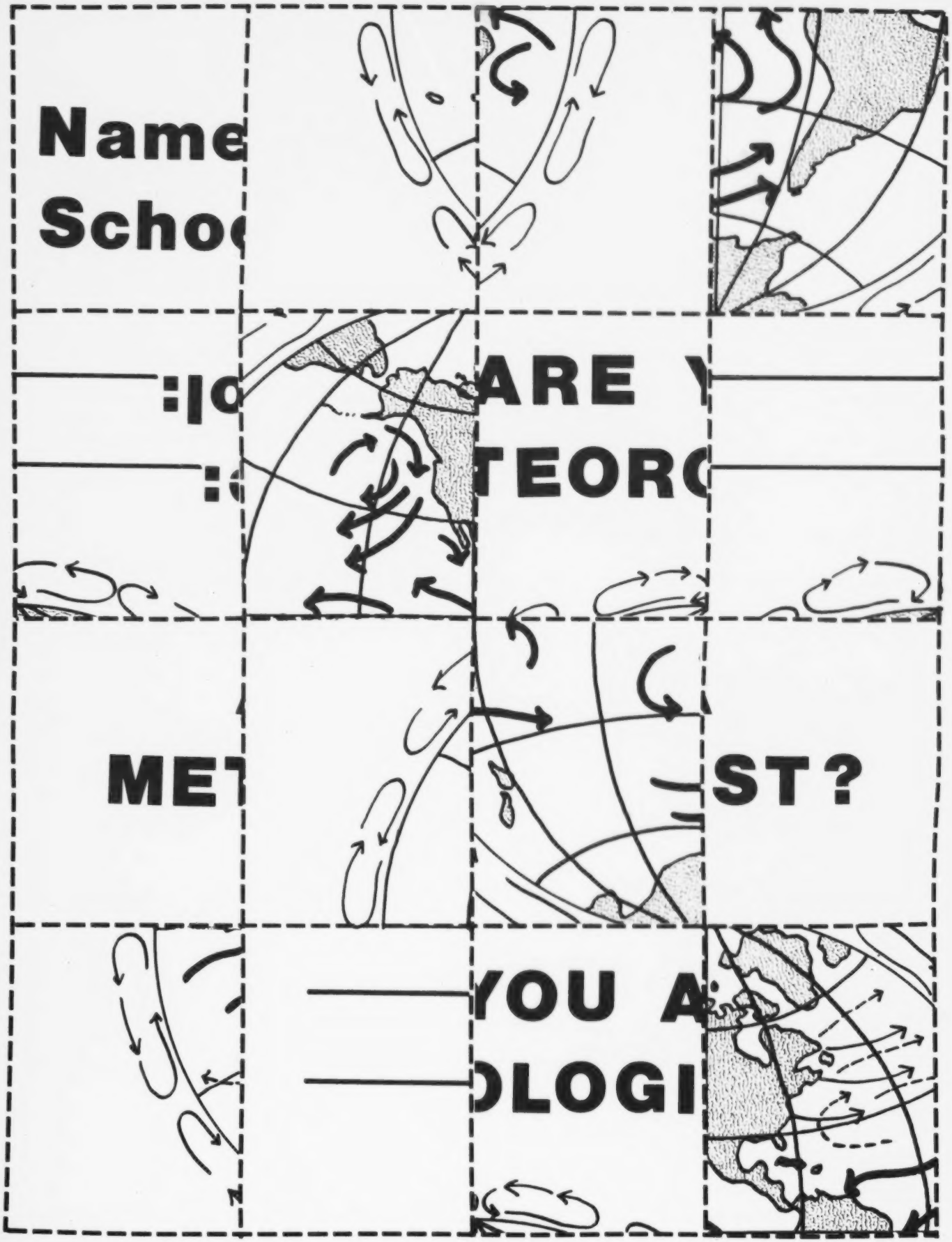
DAY OF THE WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
DATE (MO/DAY/YR)							
Time of Day							
Wind Direction							
Wind Speed: mph (km/hr)							
Wind Action: Beaufort Scale No.							
Cloud Type(s) (cirrus, stratus, nimbus, cumulus)							
Cloud Cover (clear, partly cloudy, cloudy)							
Precipitaton: In. (cm) (rain, haze, snow, mist or fog)							
Temperature: F (C)							
Barometric Pressure: In. (cm) of mercury (H HIGH, L LOW)							
Relative Humidity							
Dew Point: F (C)							
Air Pollution Index							
Major Air Pollutant							
Front (warm, cold, stationary)							
Other Observations: such as amount of weekly precipitation							

The day is: HOT (O) WARM (Y) COOL (G) FREEZING (B) SUNNY (R)

MY FEELINGS:

The sky is:

Next week's weather will be: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WEATHER LORE

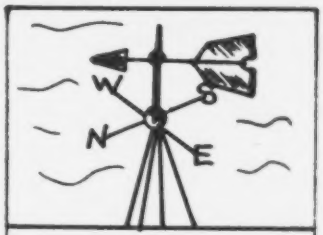
Many weather sayings and beliefs have come into being over the years. Some of these are based on superstition, others have some scientific basis. Read the statements below. Try to find out if the statement is based on "superstition" or has "some scientific basis." Mark (+) if the statement has some scientific basis and (–) if it is based on superstition. Write your answer (+) or (–) in the blank before each statement.

1. _____ "Red sky in the morning, sailors take warning; red sky at night, sailors' delight."
2. _____ "Long foretold, long last; short warning, soon past."
3. _____ "Birds suddenly sit on a wire, pack more, or roost before a storm."
4. _____ "If the moon shows a silver shield, be not afraid to reap your field, but if she rises haloed round, soon we'll tread on rainy ground."
5. _____ "Aching corns and other pains can forecast bad weather."
6. _____ "A groundhog leaves his den on February 2nd. If he sees his shadow, it means that cold weather will continue for six more weeks."
7. _____ "Dew on grass at night or in early morning is a sign of fair weather."
8. _____ "A veering wind, fair weather; a backing wind, foul weather."
9. _____ "When the wind backs and the barometer falls, then be on your guard against gales and squalls."
10. _____ "Smells are stronger before rain."
11. _____ "Duck hunters know that ducks fly higher in good weather than in bad."
12. _____ "When distant land across salt water seems closer, it usually means rain the next day."
13. _____ "Ants traveling in straight lines means rain is coming, ants scattering means clear weather."
14. _____ "Crickets act like a thermometer, chirping faster as the temperature rises. Adding 37 to the number of chirps in 15 seconds will give you the temperature in °F."
15. _____ "The wider the middle brown band on a woolly bear caterpillar the milder the winter."

WEATHER HAPPENINGS

Cut apart cards below and arrange in order from earliest to most recent dates of weather happenings. On the back of each card, write a numeral, from 1-12, that places that event in the correct order of weather events. Turn cards over face up. Have your friends place the cards in the correct order. Turn cards over to check order. Keep a record of how many of your friends are able to place the cards in the correct order. Make a graph that shows your results and present it to the class.

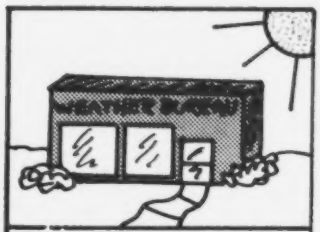
People make weather forecasts based on position of stars.



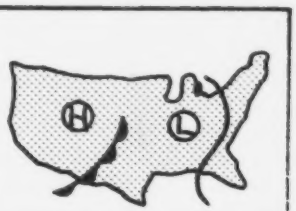
Weather vane made.

Torricelli invents the barometer.

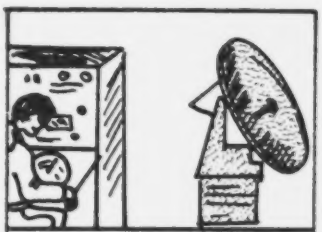
Bjerknes develops theory of weather fronts.



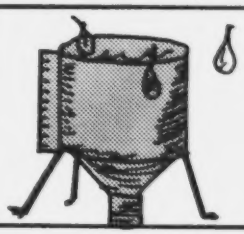
Congress establishes agency called Weather Bureau, later called National Weather Service.



Halley makes first weather map.

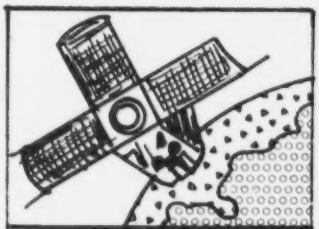


Radar first used in weather observation.

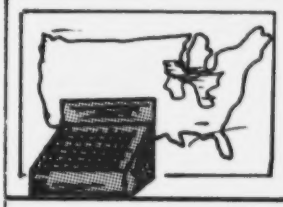


Rain gauge, earliest weather instrument, invented.

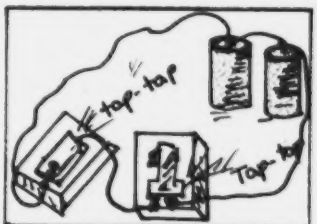
Boys' names in addition to previously used girls' names used in naming hurricanes.



U.S. launches first satellite that sends weather information back to earth.

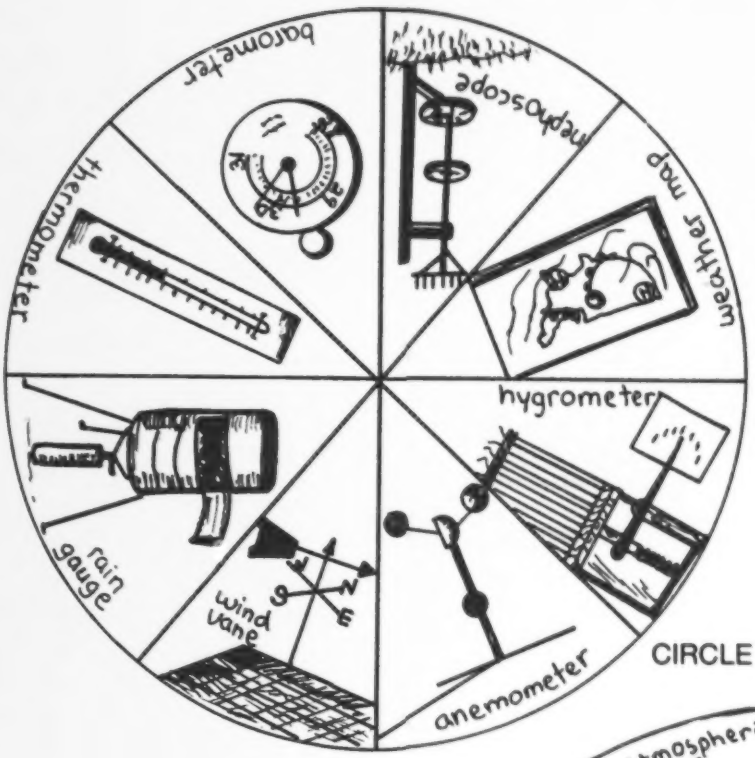


Computer first prepares weather forecast.



Morse invents telegraph to send weather forecasts.

Weather Spin and Match



CIRCLE A

Cut out circles A, B and the pointer. Mount on single-layered cardboard. Punch holes in centers of circles A and B and pointer. Place pointer on top of circle A and circle A on B. Attach at centers with paper fastener. Spin pointer. Read the name of the weather instrument. Then, rotate circle B until the description of what that weather instrument does matches the picture of the weather instrument on circle A. Make other weather wheels such as those that match different types of clouds with corresponding weather patterns.

CIRCLE B

THE WEATHER MAP

You can learn a lot from a weather map found in a newspaper at home. Cut out the map and paste it in the box at the right below. Draw the weather symbols found on the map in the boxes at the left. Print the name of each symbol on the line below each box. Then, listen to the radio or television for tomorrow's weather forecast. Use weather map and weather forecast information to answer the questions below.

Draw weather symbols here. Print name of symbol on the line below each box.

Weather map date _____

PASTE WEATHER MAP HERE

WEATHER QUESTIONS

1. What was the weather like in your part of the country the day your weather map was printed? _____
2. What was the high temperature for the day in your city? _____°F _____°C
3. What was the low temperature for the day in your city? _____°F _____°C
4. How do the high and low temperatures for your city differ from the high and low temperatures found in other parts of the United States?

   _____
5. Locate one area in the United States that had a form of precipitation. Identify that form of precipitation by using its appropriate symbol.

   _____

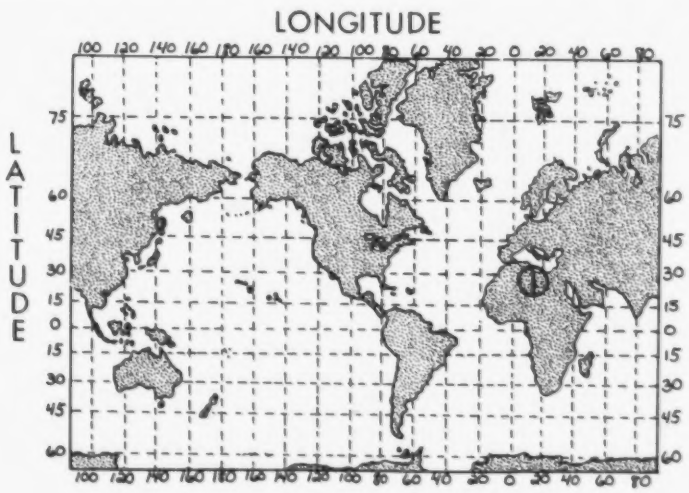
WEATHER RECORD

Below is a picture of a 45 rpm record whose title is "The Coriolis Effect by the Meteorologists." Cut out record and glue to single-layered cardboard. Laminate if possible. Punch hole in center. Place on record player. Turn on low speed. With erasable marker try to draw a straight line across the spinning record. Note the direction (right or left) of the curved line. Write a story about how this action affects our weather in the Northern Hemisphere. In the circle in the center of the record, draw arrows that show the direction, clockwise or counterclockwise, that water spins as it runs down a sink. Act out these spinning movements to the class. Would the same motion hold true in the Southern Hemisphere? Write a friend who lives in the Southern Hemisphere to verify your results. Include a copy of your letters in your science notebook.

AMAZING WEATHER RECORDS!

Listed below are major weather records and locations of cities and countries where these records have been set. Identify the seven major continents on the map below. Then, place the numeral in the correct country on the map that shows where that weather record was set. The first one is done for you. Find out the type of weather conditions and related geographical features that caused that record to be set.

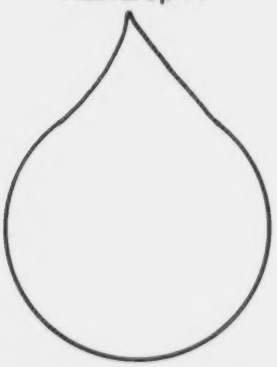
1. Highest world known shade temperature (136°F, 58°C)	Al' Aziziyah (El Azizia) Libya
2. Lowest recorded world temperature (-127°F, -88°C)	Vostok, Antarctica
3. Coldest place where people live (-96°F, -71°C)	Oymyakon, Siberia, USSR
4. Greatest world temperature change 192°F (-94°F to 98°F) 89°C (-70°C to 37°C)	Verkhoyansk, Siberia, USSR Lena River, Siberia, USSR
5. Greatest depth of permafrost (4,920 ft., 1,491 m)	Eden, Australia
6. Highest waterspout (5,014 ft., 1519 m)	Arica, Chile
7. Greatest length of time without rainfall (14 years)	Paradise, Mt. Rainier, Washington, USA
8. Greatest yearly snowfall (1,225 in., 3,115.5 cm)	Wichita Falls, Texas, USA
9. Fastest speed of a tornado (280 mph, 448 kph)	Mt. Waialeale, Kauai, Hawaii USA
10. Most rainy days per year (350)	Coffeyville, Kansas, USA
11. Largest hailstone (1.67 lb. [.75 kg], 7.5 in. [19 cm] diameter)	Garapan, on Saipan, Mariana Islands,
12. Least change in yearly temperature (21.2°F, -6°C)	Pacific Ocean



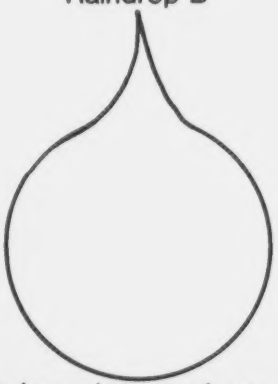
BIG RAINDROPS

A raindrop can act like a magnifying glass or lens. Cut out a piece of printed newspaper the size and shape of raindrop A below. Tape newspaper to raindrop A. Cover with clear piece of plastic or waxed paper. With an eyedropper place several drops of water on top of waxed paper so printed letter or word can be seen through the drops. In raindrop B, draw a picture of what the letter(s) on the newspaper looked like when you looked through the drops. What can you say about the power of a raindrop? Complete the sentence, "A raindrop has the power to _____ _____."

Raindrop A



Raindrop B

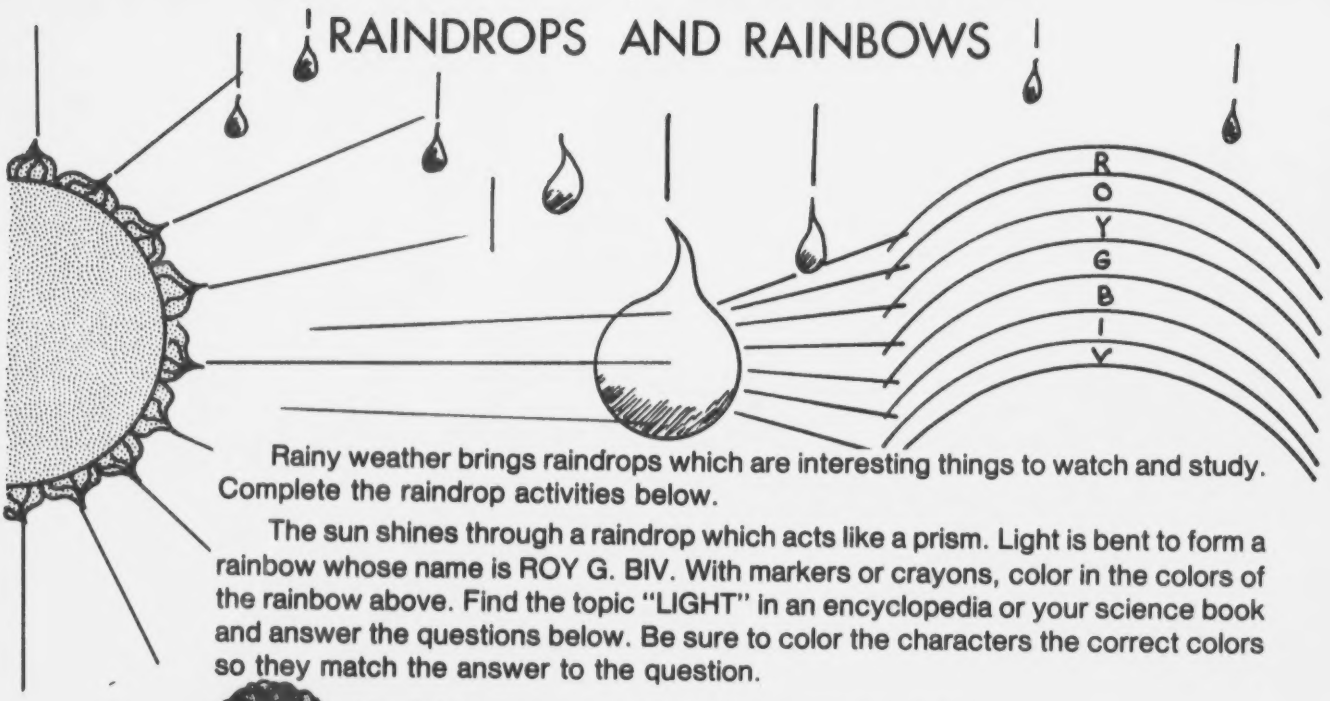


Raindrops join together to form puddles. Below is a picture of a target puddle. Place a piece of plastic or waxed paper over the target. Place raindrops in circle A until full. Record the number of drops in the "number of drops" column in the chart below. Count the number of drops it takes to extend the puddle to levels B, C, D, E, F, and G. Record. Locate puddle in sunshine. Time how long it takes each layer of your puddle to dry up. This takes quite some time, so in the meantime you may want to write a story about what you think happened to the water and how your experiment is similar to how we receive rain or snow on earth.

AND PUDDLE PLAY

Level	No. of Drops	Time to Dry Up
A	1	
B		
C		
D		
E		
F		
G		

RAINDROPS AND RAINBOWS



Rainy weather brings raindrops which are interesting things to watch and study. Complete the raindrop activities below.

The sun shines through a raindrop which acts like a prism. Light is bent to form a rainbow whose name is ROY G. BIV. With markers or crayons, color in the colors of the rainbow above. Find the topic "LIGHT" in an encyclopedia or your science book and answer the questions below. Be sure to color the characters the correct colors so they match the answer to the question.

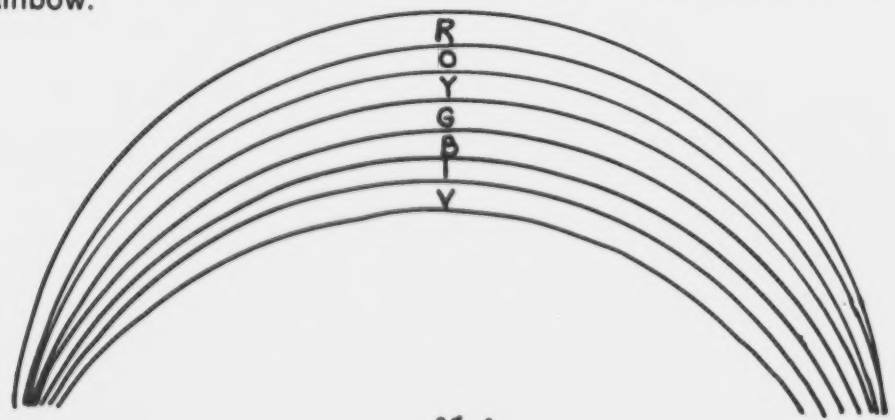
My light waves are the fastest moving light waves that we can see. I am _____.

My light waves are the slowest moving light waves that we can see. I am _____.

I have the longest light wave that we can see. I am _____.

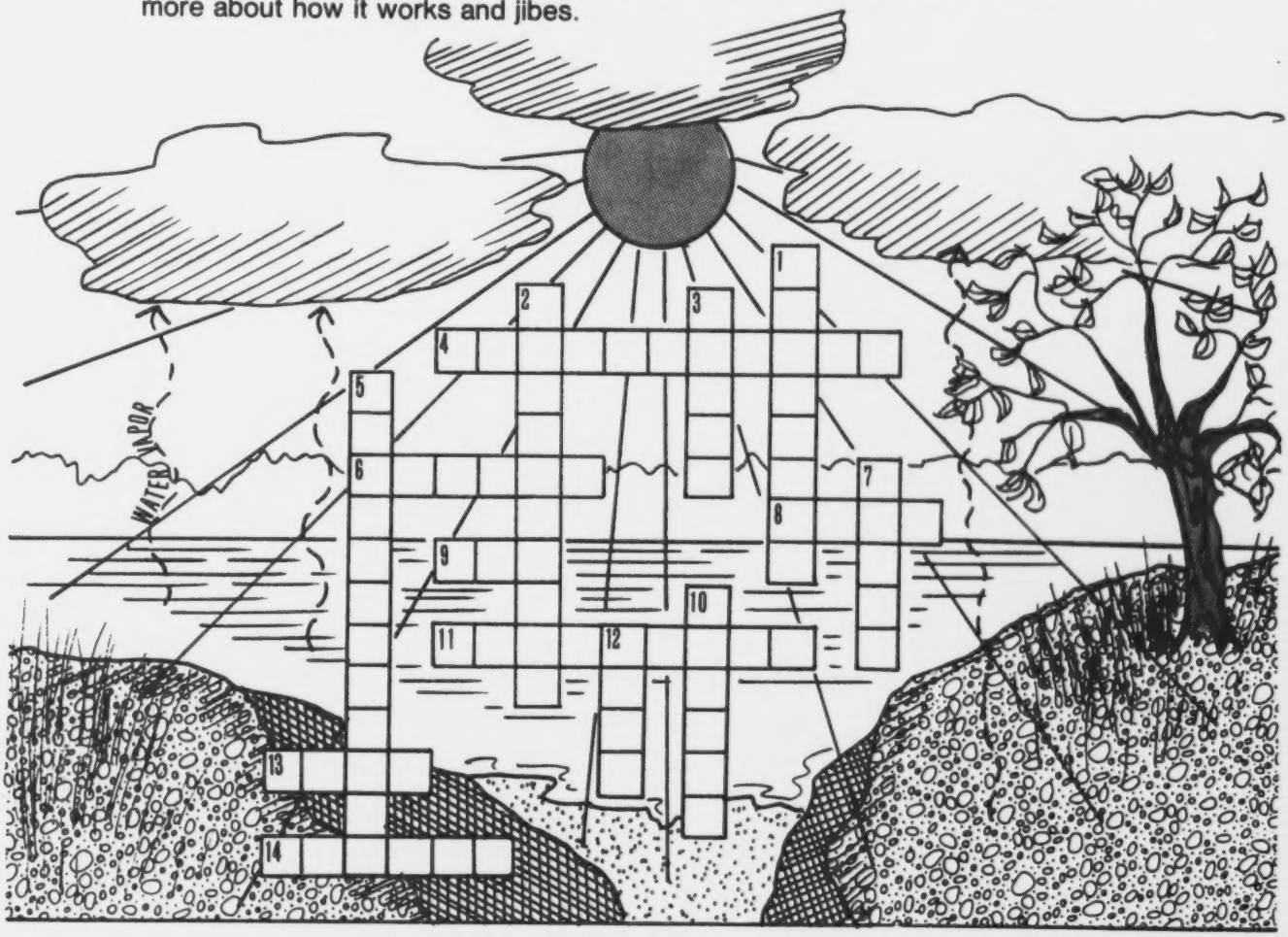
I have the shortest light wave that we can see. I am _____.

Did you know that the longest-lasting rainbow lasted for three hours over North Wales on August 14, 1979? On a world map, find the country of Wales. Draw what Wales looks like under the rainbow below. Then, color the rainbow.



WATER CYCLE

The water cycle in nature is vital to our lives. Complete the puzzle below to learn more about how it works and jibes.



ACROSS

4. The process of liquid water changing to water vapor is called _____.
6. The water cycle of _____ is very important.
8. Precipitation.
9. Opposite of night.
11. Very small particles.
13. Top layer on our planet's surface.
14. An opening in a wall that allows air or light in.

DOWN

1. Dampness.
2. The constant movement of water between earth and our atmosphere.
3. The gaseous state of water.
5. The process of water vapor changing to liquid water is called _____.
7. A large stream of water.
10. Millions of condensed water droplets floating in the sky.
12. Freezing _____.

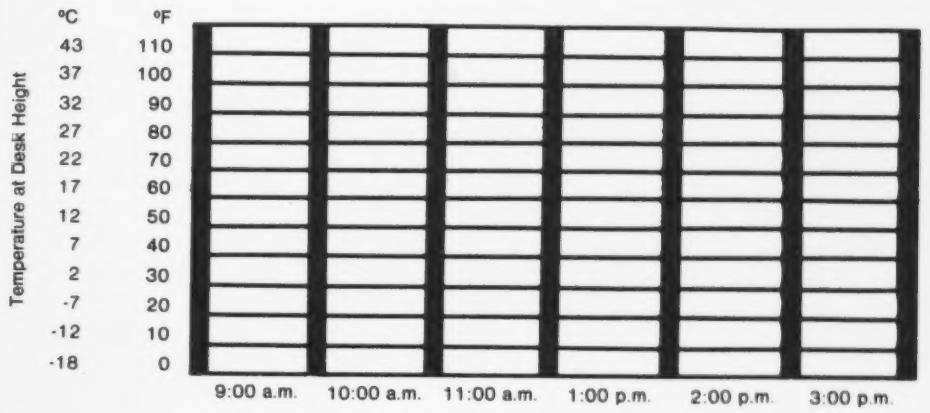
WORDS TO CHOOSE FROM

Vapor
Day
Cold
Evaporation
Molecules
Moisture
Soil
Condensation
Rain
River
Water Cycle
Nature
Window
Clouds

Temperature Studies

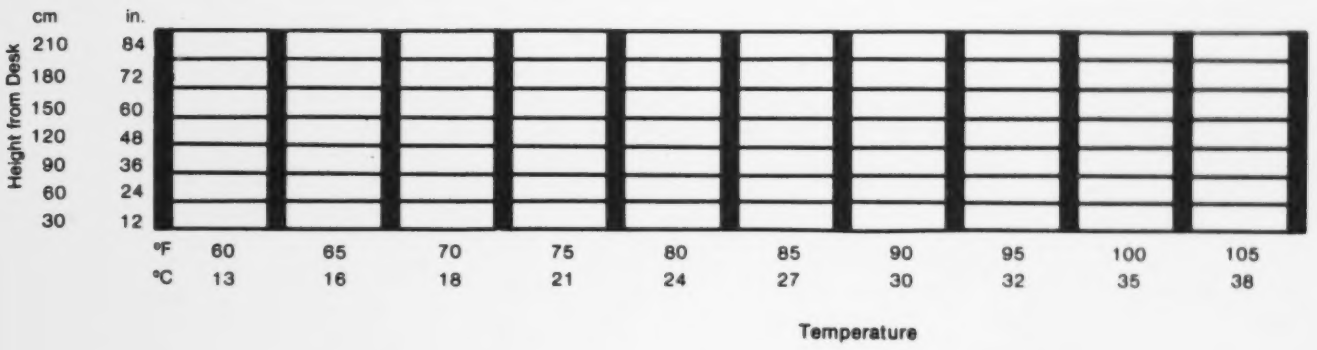
Place a thermometer on your desk and take the classroom temperature at one-hour time periods. Make a bar graph by coloring in these temperatures on Chart A below. Then, record the classroom temperature at various heights from your desk in Chart B. Make a line graph that shows your results. From Chart A, what can you tell about the temperature as the time of day increases? What can you tell about the temperature from Chart B as the height from which you took the temperature increases? Do these same temperature activities outside your classroom and record your results in your science notebook. Then, investigate changes in atmospheric temperature that you as a pilot and your plane would experience on a flight that begins at takeoff, cruises to 33,000 ft. (10,000m) and then descends to make a successful landing. Assume for every 1,000 feet of altitude gained on your climb to 33,000 feet the temperature drops 2°C or 3½°F. This is called the standard ambient temperature lapse rate and is used by pilots to determine temperatures aloft. On takeoff the temperature for this problem will be the standard sea level temperature of 59°F.

CHART A



Major Result: _____

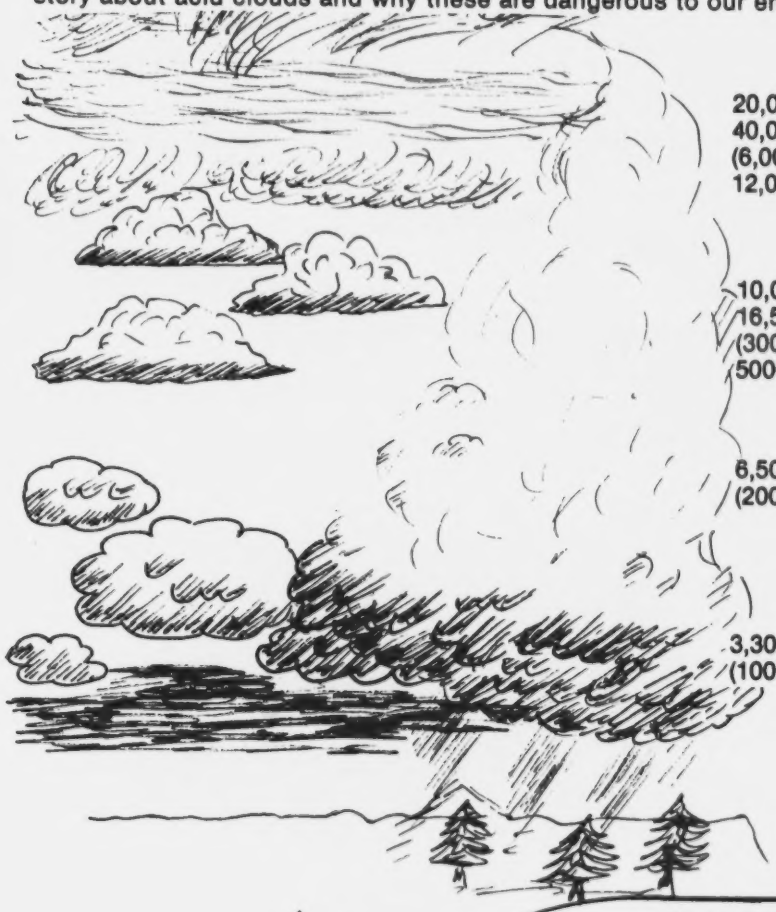
CHART B



Major Result: _____

CLOUDS & WINDS BRING WEATHER

Clouds can tell you what kind of weather the winds will bring if you read their signs correctly. Lie on your back and look at the sky. Watch how clouds form, what direction they move in and the direction from which the wind blows. Below is a picture of you looking at the sky which contains four types of clouds. Read the approximate distances the clouds are above the ground, using the altitude scale below. Read the story as told by each cloud below. Then, fill in the name of the cloud pattern in the blank below the story. Look up the prefixes CIRRO, ALTO, CUMULO and STRATO. What do these tell you about clouds? In your science notebook, write a story about acid clouds and why these are dangerous to our environment.



20,000-40,000 ft. (6,000m-12,000m)

"I am made up of white clouds shaped like feathers. My prefix is CIRRO which means high. I am the highest cloud in the sky. I'm called an ice cloud because I'm made up of crystals. I usually forecast good weather, especially if the wind carries me from the west. I am ___ _____."

10,000-16,500 ft. (3000m-5000m)

"I am made up of thick clouds and look like a heap or pack of cotton or wool. I usually have a flat bottom and bring fair weather if I'm not growing upward. I am _____."

6,500 ft. (2000m)

"I am made up of thick grey clouds that have no real definite shape. I usually bring rain or snow, especially if I get together with my friends found above me. I am _____."

3,300 ft. (1000m)

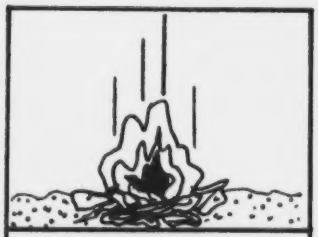
"I am made up of low layers of clouds but cover a wide area of the sky. I usually am born during calm weather. If, however, I get thicker or get together with my friend above me and the wind brings us in from the northeast or south, we may bring rain or snow. I am _____ _____."

Somewhere, what with all these clouds and all this air, there must be a rare name, somewhere... How do you like "cloud-cuckoo-land."

Aristophanes

BEAUFORT'S BONANZA

The Beaufort Scale is a wind scale that describes the speed of the wind, the numeral one for least wind, the numeral twelve for the greatest wind speed. Below are twelve drawings that show the effects of wind. Using the Beaufort Scale, label each drawing with the appropriate wind speed and Beaufort symbol. The first one is done for you. You may use page 18 to help you with this activity.



smoke rises vertically

Beaufort no.: 0

wind speed: less than 1 mph

symbol: 0

trees uprooted, buildings severely damaged

Beaufort no.: 10

wind speed:

symbol:

widespread damage

Beaufort no.: 11

wind speed:

symbol:

small trees begin to sway, waves on inland waters

Beaufort no.: 5

wind speed:

symbol:

dust and paper raised

Beaufort no.: 4

wind speed:

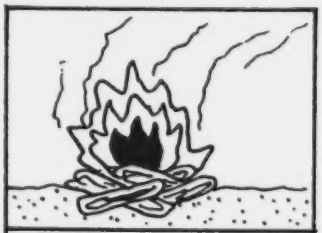
symbol:

twigs broken off trees

Beaufort no.: 8

wind speed:

symbol:



smoke drifts slightly

Beaufort no.: 1

wind speed:

symbol:

large branches move, umbrellas hard to use

Beaufort no.: 6

wind speed:

symbol:

leaves and twigs in constant motion

Beaufort no. 3

wind speed:

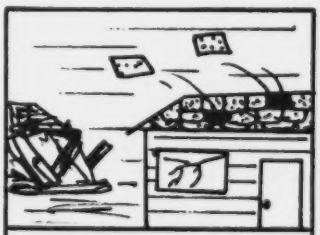
symbol:

whole trees bend, hard to walk against wind

Beaufort no. 7

wind speed

symbol:



buildings damaged

Beaufort no.: 9

wind speed:

symbol:

leaves rustle, vane moved

Beaufort no.: 2

wind speed:

symbol:

STORMY NAMES...

The National Hurricane Center in Coral Gables, Florida, keeps an eye on a tropical storm that may become a hurricane. A hurricane is a circulation of wind that speeds above 74 miles (120 km) per hour, the strongest wind (12) of the Beaufort Scale. When the circular wind's speed gets above 39 miles (62 km) per hour, the center gives the tropical storm a name. Below are lists of 5-year names for Atlantic storms and 4-year names for Eastern Pacific storms. Circle the names of hurricanes as they occur. In the chart below, make a list of letters that are *not* used in the naming of tropical storms. Find out why these letters are not used and report your findings to the class. Then, list several names that could be used for these letters that are not currently being used to name hurricanes.

Names for Atlantic Storms

	1983	1984	1985	1986	1987
A	Alicia	Ana	Allen	Arlene	Alberto
B	Barry	Bob	Bonnie	Bret	Beryl
C	Chantal	Claudette	Charley	Cindy	Chris
D	Dean	David	Danielle	Dennis	Debby
E	Erin	Elena	Earl	Emily	Ernesto
F	Felix	Frederic	Frances	Floyd	Florence
G	Gabrielle	Gloria	Georges	Gert	Gilbert
H	Hugo	Henri	Hermine	Harvey	Helene
I	Iris	Isabel	Ivan	Irene	Isaac
J	Jerry	Juan	Jeanne	Jose	Joan
K	Karen	Kate	Karl	Katrina	Keith
L	Luis	Larry	Lisa	Lenny	Leslie
M	Marilyn	Mindy	Mitch	Maria	Michael
N	Noel	Nicolas	Nicole	Nate	Nadine
O	Opal	Odette	Otto	Ophelia	Oscar
P	Pablo	Peter	Paula	Phillippe	Patty
R	Roxanne	Rose	Richard	Rita	Rafael
S	Sebastien	Sam	Shary	Stan	Sandy
T	Tanya	Teresa	Tomas	Tammy	Tony
V	Van	Victor	Virginie	Vince	Valarie
W	Wendy	Wanda	Walter	Wilma	William

Names for Eastern Pacific Storms

1983	1984	1985	1986
Andres	Agatha	Adrian	Aletta
Blanca	Blas	Beatriz	Bud
Carlos	Celia	Calvin	Carlotta
Dolores	Darby	Dora	Daniel
Enrique	Estelle	Eugene	Emilia
Fefa	Frank	Fernanda	Fabio
Guillermo	Georgette	Greg	Gilma
Hilda	Howard	Hilary	Hector
Ignacio	Isis	Irwin	Iva
Jimena	Javier	Jova	John
Kevin	Kay	Knut	Kristy
Linda	Lester	Lidia	Lane
Marty	Madeline	Max	Miriam
Nora	Newton	Norma	Norman
Olaf	Orlene	Otis	Olivia
Pauline	Paine	Pilar	Paul
Rick	Roslyn	Roman	Rosa
Sandra	Seymour	Selma	Sergio
Terry	Tina	Todd	Tara
Vivian	Virgil	Veronica	Vicente
Waldo	Winifred	Wiley	Willa

The five letters not used to name hurricanes are: _____

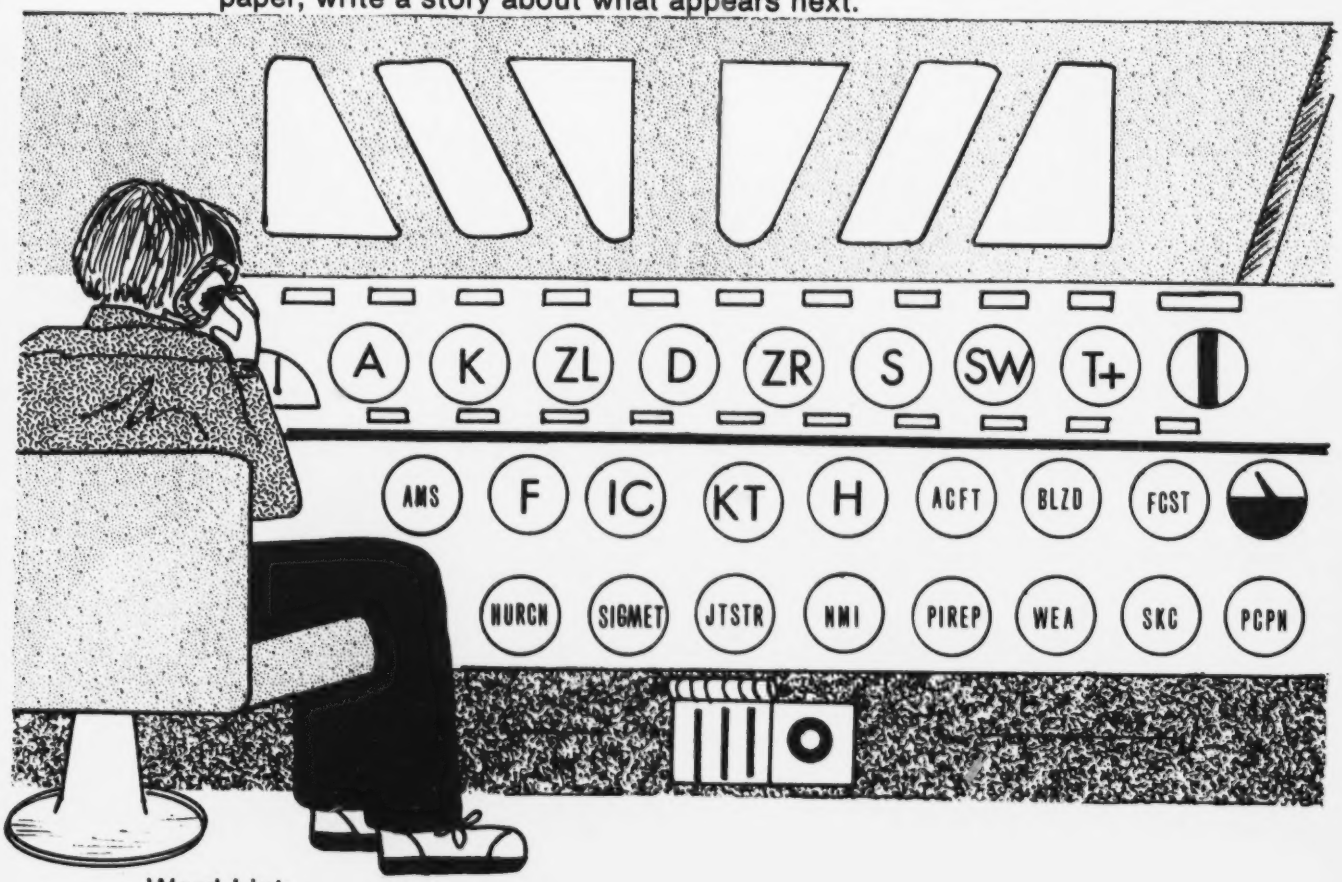
Some suggested names for these hurricanes are:

WEATHER TERMS FOR PILOTS

You are seated in the cockpit of an airplane below. The instrument panel has lighted dials on which various weather-related letters are written. You need to know the meanings of these terms to navigate the craft. From the word list below, write the number of the correct word below the letter(s) on the dial. Then, decode and write out the following message:

The WEA FCST for today includes SKC with no PCPN. Your ACFT will fly through an AMS and enter the JTSTR at 400 KTS or 400 NMI (741 km) per hour. Tomorrow, your WEA will change drastically as you board your ACFT and take off through a H, including some K and F. Your ACFT will be pelted with some S and A. IC will form on its wings as you first enter a T+, then a ZL, ZR, SW and finally a BLZD. The temperature will rise as the BLZD returns to a T+. Suddenly you find yourself at the eye or center of a HURCN. You note in your PIREP that all is suddenly quiet and that you are at peace with yourself. On the back of this paper, write a story about what appears next.

SIGMET



Word List:

(1) Aircraft, (2) Air Mass, (3) Blizzard, (4) Dust, (5) Fog, (6) Forecast, (7) Freezing Drizzle, (8) Freezing Rain, (9) Hail, (10) Haze, (11) Hurricane, (12) Ice Crystals, (13) Jet Stream, (14) Knot(s), (15) Nautical Mile, (16) Significant Weather Information From Meteorologist, (17) Pilot Report, (18) Precipitation, (19) Severe Thunderstorm, (20) Sky Clear, (21) Smoke, (22) Snow, (23) Snow Showers, (24) Weather.

WEATHER HIKE

Below is a picture of a typical pleasant summer day. Some of the weather objects are hidden. Find and circle each of the objects listed below. Print the name next to the object. Describe how each object is related to the weather. The first one is done for you. After you have completed your task, color the picture and enjoy its pleasant scenery.

Object	Name	How Object is Related to Weather
Something round	Barometer	Measures Atmospheric Pressure
Something fuzzy	Rabbit	
Something that begins with "R"	Rain	
Something older than you are	Sun	
Something you hear	Wind Chimes	
Something fluffy	Clouds	
Something that flies	Wind Sock	
Something that turns	Anemometer	
Something loose in warm weather	Telephone Wires	
Something that cracks	Rocks	
Something rectangular	Thermometer	
Something with an "R" value	A Roll of Insulation (side view)	
Ice Crystals form here	Window Pane	

WEATHER SURVEY

Survey at least six of your friends on what they predict the weather will be like at noon tomorrow. Have your friends predict the type of weather (Column 1), temperature (Column 2), cloud cover (Column 3) and wind speed (Column 4). Complete the chart below using the weather symbols found on page 18. Find out if your friends' predictions were correct (C) or incorrect (I) and the percent of correct and incorrect predictions. Can you and your friends predict the weather more accurately than your local weather forecaster? Find out and share your results with your local weatherperson.

NAME OF CLASSMATE	WEATHER TYPE		TEMPERATURE		CLOUD COVER		WIND SPEED	
	Predict	Result C or I	Predict	Result C or I	Predict	Result C or I	Predict	Result C or I

Total No. Predictions Correct (C) =
Total Percent Correct =

Total No. Predictions Incorrect (I) =
Total Percent Incorrect =

WEATHER SURVEY SYMBOLS

Use these symbols to record your friends' weather predictions found in the chart on the previous page.

WEATHER TYPE	
Rain	R
Snow	S
Cloudy	C
Windy	W
Smog	SMG
Fog	FG
Sunny	SUN
Frost	FST

Other

Fog (FG)

Smog (SMG)

Rain (R)

Frost (FST)

Thunderstorm (T)

Snow (S)

Temperature		°C	°F
HOT	Orange	30°-45°	80°-113°
WARM	Yellow	15°-30°	59°-80°
COOL	Green	0°-15°	32°-59°
FREEZING	Blue	Below 0°	Below 32°

Cloud Cover

CLEAR — No Clouds

PARTLY CLOUDY — Less Than Half of the Sky Covered

MOSTLY CLOUDY — More Than Half of the Sky Covered

OVERCAST — No Blue Sky Can Be Seen

Wind Conditions

CALM — No Air Motion

BREEZY — Leaves in Motion, Water Rippled

WINDY — Tree Limbs Moving, Whitecaps on Water

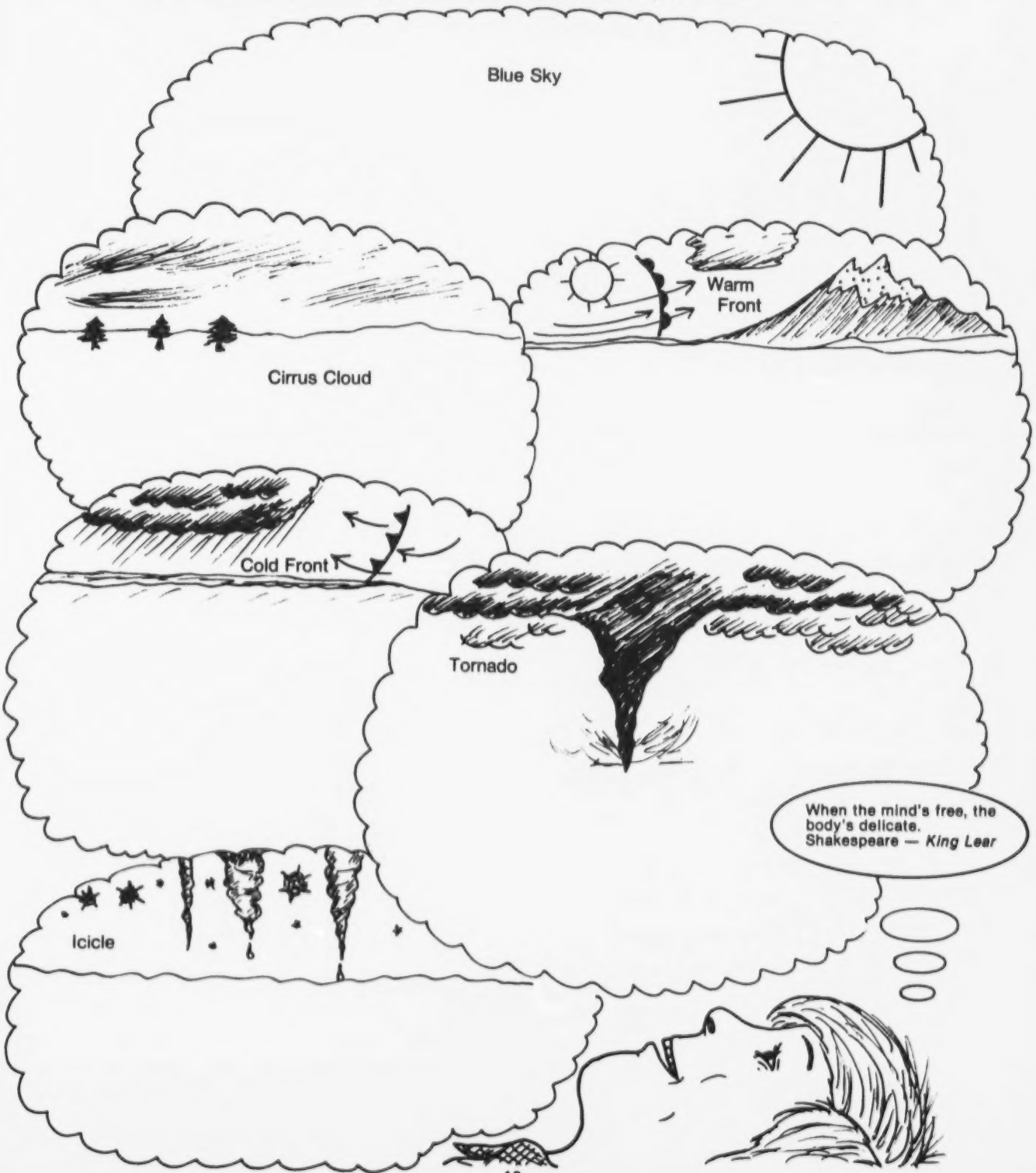
VERY WINDY — Tree Trunks Bend, Water Rough

BEAUFORT SCALE FOR ESTIMATING WIND

Wind		Speed (MPH)	Beau. No.	Wind Effects
Calm		Less than 1	0	smoke rises vertically
Light Air		1-3	1	smoke drifts slightly
Light Breeze		4-7	2	leaves rustle, vane moved by wind
Gentle Breeze		8-12	3	leaves and twigs in constant motion, wind extends light flag
Moderate Breeze		13-18	4	dust and paper raised; small branches moved
Fresh Breeze		19-24	5	small trees begin to sway; crested wavelets form on inland waters
Strong Breeze		25-31	6	large branches move; umbrellas hard to use
Moderate Gale		32-38	7	whole trees bend; hard to walk against the wind
Fresh Gale		39-46	8	twigs broken off trees
Strong Gale		47-54	9	buildings damaged
Whole Gale		55-63	10	trees uprooted; buildings severely damaged
Storm		64-75	11	widespread damage
Hurricane		above 75	12	devastation occurs

WEATHER FEELINGS

Find a quiet spot where you will be alone and undisturbed for ten minutes. Look at each picture below. Close your eyes and pretend you are a blue sky, a wispy cirrus cloud, the warm rising air of a warm front, sinking cold air of a cold front, an icicle, and tornado. In each picture below write a paragraph about how you felt while you were one of these weather happenings. Share your stories with members of your class.

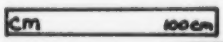


Weather Station

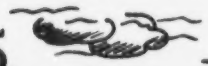
Below is a picture of a typical weather station. Use the clues to identify each weather instrument that is located around the house. Place its name in the correct blank. Then, write the number of the statement that describes the instrument in the proper blank on that instrument on the weather house itself. On a separate paper, list the name of the weather object and tell what the object is used for when studying weather.

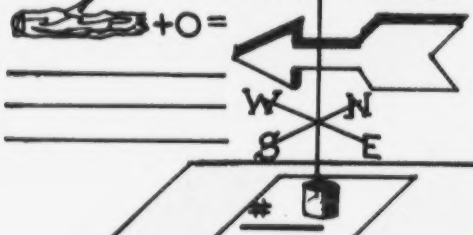
1. + + E = _____

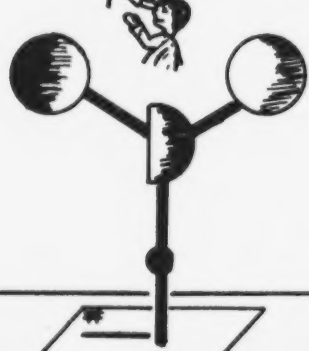
2. T + + MO + = _____

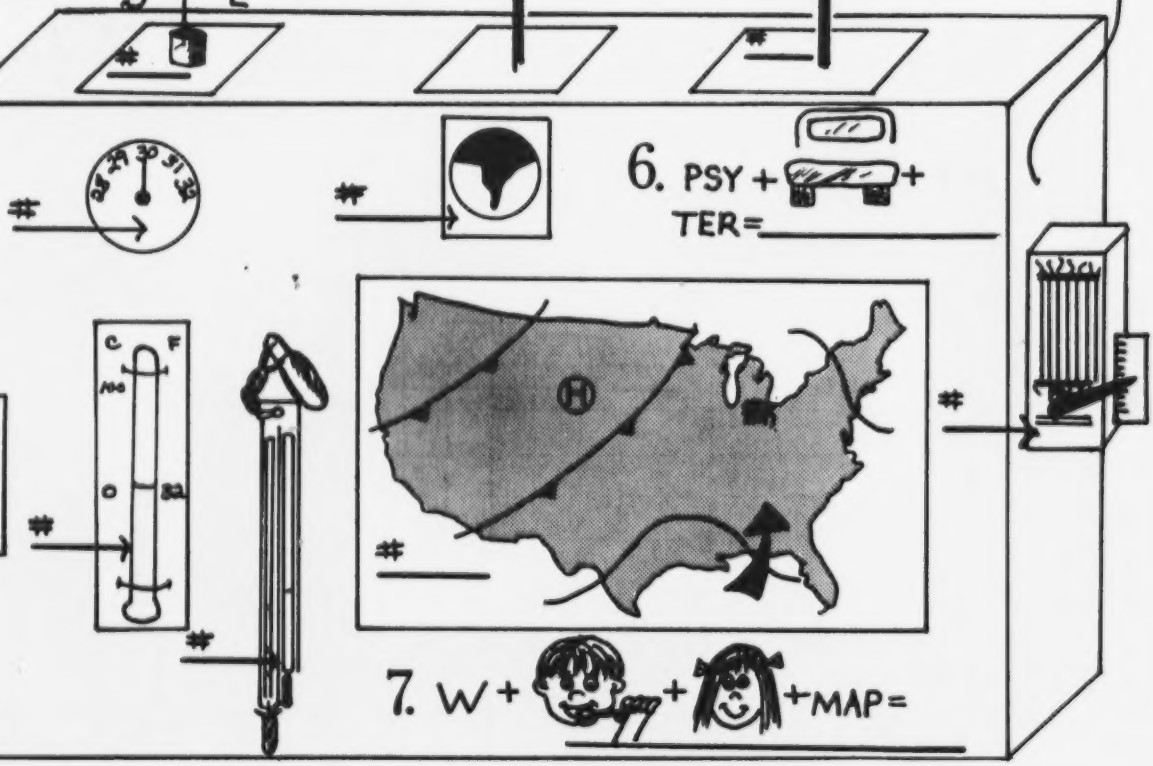
3. + Grom +  = _____

4. ANE + + ETER = _____

5.  + WARN + TORNADO + = _____





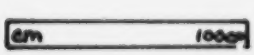


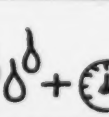
6. PSY + + TER = _____

7. W + + + MAP = _____

8. + = _____

9. W + + + + OON = _____

10. + O +  = _____

11.  = _____

Be Wise, Be Safe

STORM WATCH: Alerts you to possible severe weather ahead. Be prepared to take shelter.
STORM WARNING: Severe weather is imminent. Take cover immediately.

TORNADOES

1. You - Make plans for tornado safety long before tornado happens.
2. You - Know tornado weather. Look for thunderstorms, hail and dark funnel clouds. Listen for loud roar.
3. You - Listen for tornado watches and warnings. Listen for sirens.
4. You - Stay away from windows, doors and outside walls.
5. You at Home - Go to basement or lowest floor in middle of house. Get under something sturdy. Protect your head. Make body as small as possible.
6. You in School - Follow your teacher's directions. Stay away from gym or auditorium.
7. You - Take a flashlight and transistor radio to shelter area.
8. You - If in open country, lie flat in a ditch.

HEAT WAVES

1. You - Drink plenty of water and other liquids.
2. You - Stay indoors in air-conditioned surroundings.
3. You - Rest in shaded areas if outside.
4. You - Avoid strenuous exercise.
5. You - Limit intake of salt.
6. You - Listen to radio or TV for heat wave warnings. Plan ahead.

LIGHTNING

1. You - Watch the sky. Plan for safe place to go when storm approaches.
2. You - Get inside the house. Stay away from windows and doors.
3. You - Stay away from lone trees and hilltops. Seek shelter under low clump of trees or low spot such as a ravine.
4. You - Stay away from water such as swimming pools, ponds, lakes and oceans.
5. You - Get away from tractors, golf clubs, golf carts, fishing rods and bicycles. Inside an all metal car is safe.
6. You - Keep away from metal pipes.
7. You - Use telephone for emergency only.

HURRICANES

1. You - Listen to radio or TV for hurricane watch.
2. You - You and your family leave house before hurricane strikes if house is close to ocean. Get to a safe place inland.
3. You - If in house, gather battery radio and candles for light.
4. You - Store water in jugs.
5. Your Family - Board up large windows.
6. You - Pick up all loose things in yard, your toys, bicycle, etc.
7. You - Be aware of eye of hurricane. Wind stops. Skies clear but hurricane may not be over. Winds will blow in opposite direction at speeds just as furious as before.
8. You - Listen to radio for all-clear signs. Stay indoors until all clear-sign given.

FLASH FLOODS

1. You - Listen for flash flood watches and warnings.
2. You - Be alert, have a plan, move fast.
3. You - Know where there is high ground and how to get there.
4. You - Watch for thunderstorms. If river rises, get to high ground fast.
5. You - Keep away from creeks and streams.
6. You - When authorities tell you, leave fast.
7. You - After a flash flood is over, wait and be careful. Listen to radio before you return to original location.

WINTER STORMS

1. You - Wear several layers of clothing, not just one thick layer.
2. You - Wear a hood that covers your head and a scarf that covers your mouth.
3. You - Wear mittens as they are warmer than gloves.
4. You - Work slowly if you have to shovel snow.
5. Auto - Attach bright cloth to car antenna if stuck. Exercise. Stay in car keeping window open slightly.
6. Auto - Parents keep gas tank full.
7. Auto - Parents prepare car with shovel, flashlight, matches, candles, etc.
8. Home - Have food, battery radio, water, and a way to keep warm if electricity goes off.

HANDY POCKET WEATHER CHARTS

Check the wind chill with this handy pocket chart.

CUSTOMARY UNIT WIND CHILL CHART

WIND SPEED (Miles per hour)	TEMPERATURE (F°)																
CALM	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	32	27	22	16	11	6	0	-5	-10	-15	-21	-26	-31	-36	-42	-47	-52
10	22	16	10	3	-3	-9	-15	-22	-27	-34	-40	-46	-52	-58	-64	-71	-77
15	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51	-58	-65	-72	-78	-85	-92
20	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60	-67	-74	-81	-88	-95	-103
25	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66	-74	-81	-88	-96	-103	-110
30	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71	-79	-86	-93	-101	-109	-116
35	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-74	-82	-89	-97	-105	-113	-120
40	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76	-84	-92	-100	-107	-115	-123

WIND SPEED

MPH	KNOTS
1-2	1-2
3-8	3-7
9-14	8-12
15-20	13-17
21-25	18-22
26-31	23-27
32-37	28-32
38-43	33-37
44-49	38-42
50-54	43-47
55-60	48-52
61-66	53-57
67-71	58-62
72-77	63-67
78-83	68-72
84-89	73-77
119-123	103-107

Knots x 1.15 = Miles Per Hour

Miles Per Hour x 0.869 = Knots

To determine equivalent temperatures, use this pocket chart.

	Kelvin	Celsius	Fahrenheit
Absolute zero	0° K	-273° C	-459° F
Fahrenheit zero	255° K	-18° C	0° F
Freezing point of water	273° K	0° C	32° F
Boiling point of water	373° K	100° C	212° F

To change Celsius to Fahrenheit and vice versa, use this chart.

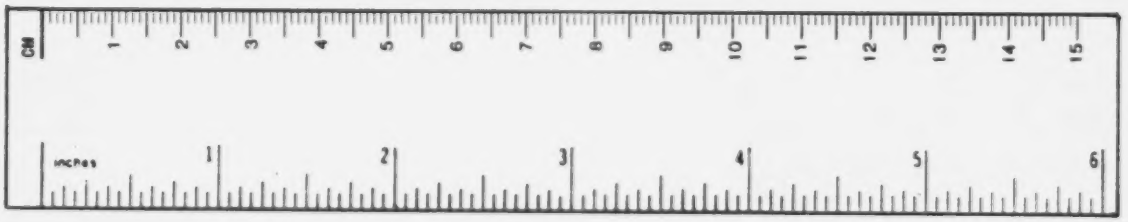
TEMPERATURE

Celsius temp. °C (9/5 C) + 32 Fahrenheit temp. °F

TEMPERATURE TO METRIC

Fahrenheit temp. °F 5/9(°F - 32) of remainder Celsius temp. °C

To measure the depth of snow in inches and centimeters, use this handy ruler.



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TEACHER/PARENT GUIDE

MY DAILY WEATHER RECORD

Activity Page Number ii

Concept: recording of weather happenings

Materials: pens or pencils, 4 activity sheets (one per week) per student, reference materials such as *Weather: Air Masses, Clouds, Rainfall, Storms, Weather Maps, Climate* by Herbert S. Zim and Paul E. Lehr.

Description: This activity encourages youngsters to chart weather happenings over a period of one month. Distribute one activity sheet per week per youngster. Youngster fills in his name, date, week number and time of each observation. Clocks that show the time of observation can also be drawn in the appropriate spaces. Youngsters should complete the chart using weather symbols and color in the five types of responses to "The Day is..." O = orange (hot), Y = yellow (warm), G = green (cool), B = blue (freezing) and R = red (sunny). Illustrated symbols and numerical readings should be used to complete other columns. Youngsters should consult page 18 for information on the Beaufort Scale and their local radio, television or telephone weather information services for pertinent data. Extend activity by having youngsters predict next week's weather and by writing about how their feelings are affected by the weather.

Answers: Answers will vary with local weather conditions.

ARE YOU A METEOROLOGIST?

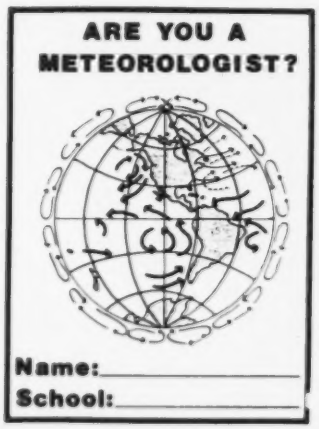
Activity Page Number 1

Concept: career awareness in science, development of self-concept, atmospheric wind conditions and weather patterns in the Western World

Materials: scissors, glue, stiff cardboard (8½" X 11" cardboard from back of writing tablets) or tagboard, laminating machine if available, reference materials such as a dictionary or encyclopedia on weather, and *Storms–From the Inside Out* by Malcolm E. Weiss, basketball or globe, one sheet per student.

Description: Have youngsters cut activity sheet into designated 16 squares. Rearrange puzzle pieces to make complete picture. Glue pieces in place onto cardboard or tagboard. Add names of student and school. Color. Decorate. Use as front cover of Student Weather Book. Discuss career of a meteorologist while reading *Storms*. Examine geographical areas in the Western World. Identify the continents and geographical features using lines of latitude and longitude. (Use a basketball or globe to show this.) Discuss basic wind patterns in the Western World on cover. Heavy, solid arrows are year-around winds, light solid arrows on globe are winter winds, and dashed broken arrows are summer winds. Arrows outside globe indicate movement of winds if the earth did not rotate. Surface air would move toward the warm equator, heat, rise and return to the polar region. Duplicate back cover of Student Weather Book (activity page 23). Follow same procedure. Laminate both covers. Tape front cover to back cover and use as a folder for pages that make complete Student Weather Book. Youngsters can also use a 3-ring binder for this purpose.

Answers: Completed project looks like this:



WEATHER LORE

Activity Page Number 2

Concept: distinguish between science and superstition, myths and scientific facts, demonstrate the tentativeness of science

Materials: pens or pencils, reference materials such as *Eric Sloane's Weather Book, Folklore of American Weather* by Eric Sloane, *Weather Lore* by R. Inwards, *Strange Mysteries From Around the World* by Seymour Simon or *January Fog Will Freeze a Hog and Other Weather Folklore* by Herbert Davis.

Description: Hold class discussion on folklore, myths and superstitions such as the numeral 13, black cats and walking under a ladder. Give youngsters activity sheets. Encourage research to determine if each statement has some scientific basis (+) or is a superstition (–). Complete activity sheet. Have youngsters write stories of their favorite weather lore noting whether they feel they are fact or fiction. Youngsters may also want to do this activity with their family members and then report their results to the class.

Answers:

1. +	6. –	11. +
2. +	7. +	12. +
3. +	8. +	13. +
4. +	9. +	14. +
5. +	10. +	15. +

NOTE for answer 15:
Some say this is an old wives' tale; others say there is some scientific basis. Either way, we've had fun with it, but some may argue this point.

WEATHER HAPPENINGS

Activity Page Number 3

Concept: development of history of important weather events

Materials: pens or pencils, scissors, reference materials such as an encyclopedia, weather map from newspaper, one activity sheet per student

Description: Introduce activity with discussion of weather map found in daily newspaper. Discuss how people in early times made weather observations. Compare with how meteorologists conduct weather observations today. Give each student an activity sheet and reference materials which include encyclopedias and dictionaries. Students cut apart cards and write appropriate numerals on reverse sides of cards that show the correct historical sequence of weather happenings. Youngsters can also write the dates of the happenings and other pertinent information on the reverse sides of the cards before doing the activity with others. Laminate. Staple into booklet of weather happenings and insert into small envelope. Glue envelope and top part of activity sheet to another sheet of paper and insert into student weather book.

Answers:

Card No.	Happening	Year
1	People made weather forecasts based on position of stars	2000 B.C.
2	Rain gauge, earliest weather instrument, invented	300 B.C.
3	Weather vane made	50 B.C.
4	Torricelli invented the barometer	1643 A.D.
5	Halley made first weather map	1686 A.D.
6	Morse invented telegraph to send weather forecasts	1844 A.D.
7	Congress established agency called Weather Bureau later called National Weather Service	1890 A.D.
8	Bjerknes developed theory of weather fronts	1890 A.D.
9	Radar first used in weather observation	1940's A.D.
10	Computer first prepared weather forecast	1950 A.D.
11	U.S. launched first satellite that sends weather information back to earth	1959 A.D.
12	Boys' names in addition to previously used girls' names used in naming hurricanes	1978 A.D.

WEATHER SPIN AND MATCH

Activity Page Number 4

Concept: identification of weather instruments and their uses

Materials: scissors, stiff cardboard or tagboard, glue, paper fastener, paper punch, reference materials, such as *Weathercraft* by Athelstan F. Spilhaus, one activity sheet per student

Description: Have youngsters cut out circles A and B and the pointer. Glue to single-layered cardboard or tagboard. Laminate. Punch holes in centers of both circles and pointer. Place pointer on top of circle A and circle A on top of circle B. Attach at centers with paper fastener. Children spin pointer. Name weather instrument. Youngsters then rotate circle B until the use of the instrument matches the weather instrument on circle A. Extend this activity further into a study of clouds and weather patterns sketched on weather wheels made from pizza discs.

Answers:
Weather Map--Shows Weather Patterns
Hygrometer--Measures Humidity
Anemometer--Tells Wind Speed
Wind Vane--Tells Wind Direction
Rain Gauge--Measures Rainfall
Thermometer--Measures Temperature
Barometer--Measures Atmospheric Pressure
Nephoscope--Shows Cloud Direction

THE WEATHER MAP

Activity Page Number 5

Concept: weather information gained from a weather map, weather symbols

Materials: pens or pencils, scissors, newspapers, glue, tape recorder, radio or television, one activity sheet per student

Description: Introduce activity with tape-recorded weather forecast. Have youngsters listen intently for weather information given. Distribute newspapers and activity sheets. Youngsters cut out weather maps and paste on activity sheets. Weather symbols from the map are drawn in the boxes at the left and identified. Questions at the bottom of the page are then answered by interpreting information found on the weather map itself.

Answers: Answers will vary depending upon weather map chosen.

WEATHER RECORD

Activity Page Number 6

Concept: The Coriolis Effect

Materials: erasable pen, glue, single-layered cardboard, pencil for hole punching, record player, laminator if available, one activity sheet per student

Description: Introduce activity by playing weather related record such as "Summer Breeze" by Seals and Crofts to the class. Inform students that they will be finding out how a record player can teach them about the weather. Youngsters cut out record, glue to cardboard, laminate and punch hole in center. Place on record player. With erasable pen, youngsters attempt to draw a straight line across the slow, spinning record. Note the curved line to the right symbolic of air currents being deflected to the right or north in the Northern Hemisphere giving various weather patterns. Youngsters can then dramatize this action. Extend activity further by studying the motion of water running down a sink. Verify results by writing pen pals who live in the Southern Hemisphere. Possible pen pal addresses can be obtained from: Big Blue Marble, Dear Pen Pal, P.O. Box 4054, Santa Barbara, CA 93103 or from various teacher-related magazines.

Answers: Line is curved to the right or north in the Northern Hemisphere. This action represents the deflection of air currents to the right or north in the Northern Hemisphere, giving basic weather conditions.

AMAZING WEATHER RECORDS

Activity Page Number 7

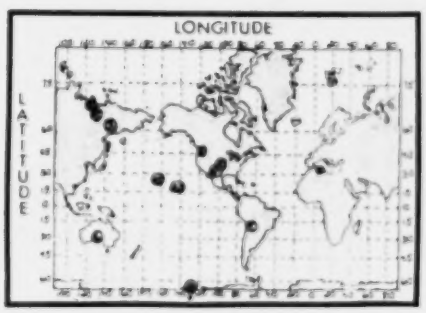
Concept: international weather records and location where each record was set

Materials: pens or pencils, reference materials such as an atlas, almanac, wall map, and *Guinness Book of World Records* by Norris McWhirter or *Weather Facts and Feats: A Guinness Superlative Book*, one activity sheet per student

Description: Introduce activity with a discussion of various records set in sporting events. Discuss how the weather also sets world records. Identify the seven major continents: Asia, Africa, North America, South America, Antarctica, Europe and Australia. Have youngsters outline the border of the continent and country in which they live. After discussing lines of latitude and longitude, youngsters place a dot on the activity sheet noting where they live. With older youngsters, an in-depth discussion of degrees latitude and longitude of their home, city and state location can be done. For younger students, approximate locations should be sufficient. Youngsters then complete the activity sheet by placing the correct numeral of each location on the map where a record has been set. This activity can be extended into a study of geographical and climatic features of each region and the relationship of these to locations where records had been set.

Answers: Approximate locations on map below.

1. Al'Aziziyak (El Azizia), Libya 33° N 13° E
2. Vostok, Antarctica 80° S 127° E
3. Oymyakon, Siberia, USSR 63° N 143° E
4. Verkhoyansk, Siberia, USSR 68° N 133° E
5. Lena River, Siberia, USSR 69° N 124° E
6. Eden, Australia 30° S 150° E
7. Arica, Chile 18° S 70° W
8. Paradise, Mt. Rainier, Washington, USA 47° N 121° W
9. Wichita Falls, Texas, USA 34° N 98° W
10. Mt. Waialeale, Kauai, Hawaii 22° N 159° W
11. Coffeyville, Kansas, USA 37° N 96° W
12. Garapan, on Saipan, Mariana Islands, Pacific Ocean 17° N 145° W



BIG RAINDROPS AND PUDDLE PLAY

Activity Page Number 8

Concept: characteristics of water, evaporation, water cycle

Materials: pens or pencils, newspapers, tape, clear plastic (clear overhead transparencies) or waxed paper, eyedroppers, clock or stopwatch, reference materials such as *The New Water Book* by Melvin Berger, overhead projector, one activity sheet per student

Description: Introduce activity with a brief discussion of the magnifying glass and how it appears to make things larger. Explain how water, too, can act as a magnifying glass. Using an indelible pen or grease pencil, write a small letter on transparency. Place another transparency sheet over first transparency on the overhead projector. Place drops of water on transparency over letter. Time how long it takes for drops to evaporate so letter reappears on transparency. While waiting, have youngsters cut out newspaper in shape of drops. Tape to raindrop A. Cover raindrop with clear plastic. Youngsters place water on plastic and note magnification of printed letters. Do Puddle Play at bottom of sheet after drops have evaporated on overhead projector and time is recorded. This activity can also be done outside on a sunny day after a rain with real puddles whose layers are marked off with string, chalk or Hula-Hoops. Extend activity further by having youngsters draw, act out, and write a story about ROY G. BIV, the action of a rainbow and colors it represents. Activity can also be used to introduce how a microscope works.

Answers: Water drops magnify printed letters on newspaper. Answers will vary for Puddle Play.

RAINDROPS AND RAINBOWS

Activity Page Number 9

Concept: wavelengths of light and corresponding colors in visible spectrum

Materials: markers or crayons, pens or pencils, world map, encyclopedia, prism, flashlight, reference materials such as *Rainbows, Halos and Other Wonders* by Kenneth Heuer, one activity sheet per student

Description: If available, shine light from flashlight through prism to make rainbow. If a prism is not available, fill a clear glass pie plate with water and place on overhead projector. Darken room. Direct youngsters' attention to rainbow on ceiling caused by overhead projector. Identify colors represented by ROY G. BIV. Youngsters consult reference materials to answer questions and color in faces to match the questions asked by the characters. Extend activity with introduction of world map. Locate Wales as the site of the world's longest lasting rainbow. Youngsters sketch Wales beneath the rainbow and color in rainbow at the bottom of the sheet.

Answers:

Violet	Red
Red	Violet

WATER CYCLE

Activity Page Number 10

Concept: water cycle: evaporation, condensation, precipitation

Materials: pencils, teakettle or empty ditto fluid can (rinse carefully), hot plate, cookie sheet, ice cubes, reference materials such as *Where Does All the Rain Go?* by Margaret Farrington Bartlett, one activity sheet per student

Description: This activity can be used as a culminating activity after youngsters have set up and studied a real water cycle. Place teakettle or can that contains ½" (1 cm) of water on hot plate located under a cookie sheet that holds ice cubes. Heat teakettle or can. Watch steam condense into water droplets on bottom of cookie sheet in the form of rain. Discuss the three stages of the water cycle — evaporation, condensation and precipitation — and how these are related to the weather. Youngsters then complete the crossword puzzle as reinforcement of concepts learned after reading *Where Does All the Rain Go?* by Bartlett.

Answers:

Across	Down
4 Evaporation	1 Moisture
6 Nature	2 Water cycle
8 Rain	3 Vapor
9 Day	5 Condensation
11 Molecules	7 River
13 Soil	10 Clouds
14 Window	12 Cold

TEMPERATURE STUDIES

Activity Page Number 11

Concept: temperature range under various conditions, atmospheric temperature, warm air rises

Materials: thermometers, crayons or markers, yardsticks (metersticks), clock, ladder, one activity sheet per student

Description: Introduce this two-day individual or small-group activity by taking room temperature at desk height at 9:00 a.m. Youngsters make bar graphs and color in temperatures at designated hours. Discuss how temperature changes as the day goes by. On the second day, youngsters can make line graphs of temperature results from measuring temperatures at different heights from their desks. Zero inches (cm) represents desk height. Discuss how warm air rises and how this is responsible for many of our weather conditions and types of flight including weather and hot air balloon flight. Extend activity further to include a discussion on why some people install ceiling fans in their homes and the function of these fans during different seasons of the year. Hopefully, youngsters will gain an understanding that ceiling fans in winter circulate rising warm air downward for warming effect and move stagnant hot air in summer for cooling effect.

Answers: Answers will vary but temperatures should increase as the day goes by as height from desk top is increased. Temperature outside airplane decreases as altitude is increased.

CLOUDS & WINDS BRING WEATHER

Activity Page Number 12

Concept: cloud types yield weather patterns

Materials: pens or pencils, reference books such as dictionaries, encyclopedias and *Cloud Studies in Colour* by Richard Scorer and Harry Wepler, one activity sheet per student

Description: This activity is best done outside on a sunny day where clouds are present. Have youngsters lie on their backs noting the formation of clouds and the direction of movement of each type. Discuss prefixes *cirro, alto, cumulo,* and *strato* and the meaning of each. The distance above the ground of each cloud type should be noted along with the kind of weather pattern related to each. Youngsters fill in the blanks on the activity sheet. Extend activity to include a discussion on "acid clouds" and "acid rain" and how these are harmful to the environment. Read about acid rain. Youngsters can also dramatize cloud patterns and movements that are related to various weather patterns. Read and discuss the poem written by Aristophanes. Youngsters may then write their own weather poems.

Answers:
1. Cirrus
2. Cumulus
3. Nimbus
4. Stratus

BEAUFORT'S BONANZA

Activity Page Number 13

Concept: wind speed scale

Materials: pens or pencils, matches, paper, glass container, Beaufort Scale found on activity page 18, one activity sheet per student

Description: This activity is done in conjunction with activity page 18. Introduce activity by striking match and noting small puff of smoke that drifts upward. Place small piece of paper in jar. Light paper with match. Note upward movement of smoke. Discuss Beaufort's Scale. Review picture one on activity sheet: Beaufort no. is 0, wind speed is less than 1 mph (less than 1 kph) and the symbol is 0. Youngsters consult activity page 18 for answers to remaining eleven cards. Fill in wind speed and Beaufort symbol. Cut out cards. Laminate. Cut each card in half forming two decks, one with the Beaufort number, wind speed and symbol, the other being the upper portion that features pictures and descriptions of the effects of wind. Youngsters can match the cards in deck one with cards in deck two and develop a play that would depict the wind's action on each card.

Answers: Answers can be found on activity page 18.

STORMY NAMES...

Activity Page Number 14

Concept: names for hurricanes

Materials: pens or pencils, U.S. map, reference materials such as *A Treasury of Names* by Evelyn Wells, one activity sheet per student

Description: Introduce activity by locating Coral Gables, Florida, the home of the National Hurricane Center, on a map. Discuss the speed of winds of hurricane proportion. Give each youngster an activity sheet. Discuss how this sheet will be used to keep a permanent record of the names of hurricanes as they occur through 1987, then repeating thereafter. Have youngsters find letters not used in naming hurricanes and give examples of each. Extend activity as youngsters find out the year both boys' and girls' names were first used to name hurricanes (1978). A letter written by the class on school stationery to the National Hurricane Center, Cable One Tower, 1320 S. Dixie Highway, Coral Gables, FL 33146, could yield significant information for this study.

Answers: Q, U, X, Y, Z
Names will vary depending on names selected for each missing letter.

WEATHER TERMS FOR PILOTS

Activity Page Number 15

Concept: flight-related weather terms

Materials: pens or pencils, reference materials such as "A Pilot's Guide to Aviation Weather Services" from the National Oceanic and Atmospheric Administration, 14th and E Street, N.W., Washington, D.C. 20230, or at your local airport's flight training office, one activity sheet per student

Description: This activity allows youngsters to take an imaginary trip into space using weather terms and symbols that pilots often use. Record, then play audio tape of airplane or spacecraft at takeoff. Discuss how weather affects flight plans and how pilots need to understand weather symbols to

navigate their crafts. On the activity sheet, have youngsters write the number of the correct term found in the list below on the appropriate dial in the cockpit. Youngsters then decode the message and complete the story in their science logbook or on the back of the activity sheet. Extend activity to include a dramatization of the action taken in this story. Include appropriate music.

Answers:

A: 9	F: 5	SIGMET: 16
K: 21	IC: 12	JTSTR: 13
ZL: 7	KT: 14	NMI: 15
D: 4	H: 10	PIREP: 17
ZR: 8	ACFT: 1	WEA: 24
S: 22	BLZD: 3	SKC: 20
SW: 23	FCST: 6	PCPN: 18
T+: 19	HURCN: 11	AMS: 2

Significant Weather Information From Meteorologist

The *weather forecast* for today includes *sky clear* with no *precipitation*. Your *aircraft* will fly through an *air mass* and enter the *jet stream* at 400 *knots* or 400 *nautical miles* (741 km) per hour. Tomorrow, your weather will change drastically as you board your *aircraft* and take off through a *haze*, including some *smoke* and *fog*. Your *aircraft* will be pelted with some *snow* and *hail*. *Icing* will form on its wings as you first enter a *severe thunderstorm*, then a *freezing drizzle, freezing rain, snow showers* and finally a *blizzard*. The temperature will rise as the *blizzard* returns to a *thunderstorm*. Suddenly, you find yourself at the eye or center of a hurricane. You note in your *pilot report* that all is suddenly quiet and that you are at peace with yourself. Note: Student stories will vary depending upon how they complete the story.

WEATHER HIKE

Activity Page Number 16

Concept: identification of and uses for weather-related objects and instruments

Materials: pencils, colored pens or markers, one activity sheet per student

Description: This activity helps youngsters identify weather objects and how these are directly related to the weather. Discuss how lines in sidewalks and joints in roads and bridges are needed for expansion purposes during changing weather conditions. Youngsters name, circle and color thirteen hidden objects found in the picture. Discuss how each object is related to the weather in our everyday lives. Youngsters can sketch other objects in the picture and describe how these are related to the weather. Then, pantomime how each object is related to the weather as youngsters guess what the object is. Youngsters can also identify physical activities engaged in and the type of weather related to each.

Answers: Completed picture of answers may look like this.

WEATHER SURVEY AND SYMBOLS

Activity Page Numbers 17 and 18

Concept: weather predictions, survey

Materials: pens or pencils, radio or television, reference materials which include the books *Doing Something About the Weather* by Victor Boesen and *Storms--The Inside Out* by Malcolm E. Weiss, activity pages 17 and 18, one per student

Description: Introduce activity by listening with youngsters to weather report on radio or television. Note weather terms, symbols, readings and predictions. Using activity pages 17 and 18, youngsters conduct a survey of six friends who predict weather conditions for noon the following day. Use symbols on page 18 for recording of predictions. At noon the following day youngsters note whether their friends' predictions were correct (C) or incorrect (I). Youngsters find the total number and percent of correct and incorrect predictions for the four areas--weather type, temperature, cloud cover and wind speed--and make a bar graph of their results. Reports of results are then sent to their friends. Extend activity further by making a large chart that shows composite data for the entire class. Find out the number and percent of correct and incorrect responses and report these results to the local radio or television station. Encourage youngsters to find out if they can predict the weather as a group more accurately than the local weather forecaster.

Answers: Answers will vary with results of surveys.

WEATHER FEELINGS

Activity Page Number 19

Concept: weather affects moods and feelings

Materials: pens, pencils, colored markers, reference materials such as *Body Weather* by Bruce Palmer, one activity sheet per student

Description: This activity encourages youngsters to become a weather-related object or phenomenon. In-

troduce activity by reading some interesting excerpts from the book *Body Weather* by Bruce Palmer. Youngsters find a place where they can be alone. On the activity sheet and in their science notebooks, youngsters can write stories about how they feel when they are each of the objects. Have them share their stories with the class by reading or dramatization. Discuss Shakespeare's quote and what it may mean to the youngsters who then can write and illustrate their favorite weather quotes.

Answers: Answers will vary with written stories.

WEATHER STATION

Activity Page Number 20

Concept: weather station and related weather instruments

Materials: pens or pencils, thermometer, reference materials such as encyclopedia and *Weathercraft* by Athelstan F. Spilhaus, one activity sheet per student

Description: Introduce activity by showing youngsters a thermometer and discussing how it is used to read the present temperature. Discuss other weather instruments and their uses. Make a list of these instruments. On the activity sheet, youngsters identify each weather instrument found in the rebus statements. Youngsters then write the number of the statement that describes the instrument on the instrument that is drawn on the weather station. As an extending activity, youngsters can sketch or cut out pictures of each weather instrument and glue to separate sheets of paper to include in their weather booklets for future use.

Answers:

1. Wind Vane
2. Thermometer
3. Hygrometer
4. Anemometer
5. Skywarn Tornado Logo
6. Psychrometer
7. Weather Map
8. Wind Sock
9. Weather Balloon
10. Barometer
11. Rain Gauge

BE WISE, BE SAFE

Activity Page Number 21

Concept(s): safety procedures for tornadoes, winter storms, lightning, flash floods, heat waves and hurricanes. Difference between storm watch and storm warning.

Materials: scissors, laminating machine if available, reference materials such as *Storm Alert: Understanding Weather Disasters* by Thomas G. Aylesworth and *Disastrous Floods and Tidal Waves* by Melvin Berger, one activity sheet per student

Description: Introduce activity with a simulated weather watch and weather warning. Youngsters should prepare to take shelter during a weather watch and take cover immediately during a storm warning. Youngsters cut apart cards. Draw corresponding weather scene on back of each card. Laminate if possible. Discuss procedures listed on each card for each type of weather condition for both a storm watch and storm warning occurring at home. Discuss school procedures followed in each situation. Then do a simulated trial run with your class. Write home and school procedures on additional cards. Laminate. Youngsters should have six owl cards from this activity plus any additional cards made for local school and home conditions. Can be used as a pocket weather booklet and guide.

Answers: Information is provided on cards. Cards developed by youngsters will vary with local school practices and procedures.

HANDY POCKET WEATHER CHARTS

Activity Page Number 22

Concept: conversion charts and weather-related measuring devices

Materials: scissors, laminating machine if available, one activity sheet per student

Description: These pocket weather charts and measuring devices come in handy when studying the weather. Youngsters cut out each card. Laminate. Consult charts when converting wind chill equivalent temperatures and wind speed. Ruler is useful in measuring depth of snow or water. When laminated and a hole punched in the corner of each, charts can be kept on a metal ring or tied together with a string for handy reference.

Answers: Completed pocket charts.

I AM A METEOROLOGIST!

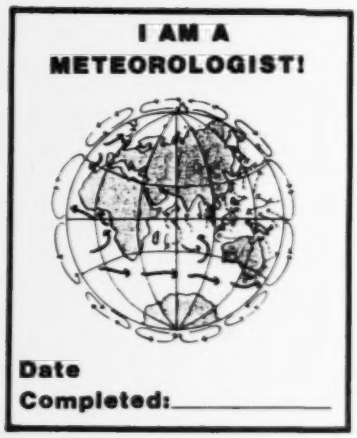
Activity Page Number 23

Concept: career awareness in science, development of self-concept, atmospheric wind conditions and weather patterns in the Eastern World

Materials: scissors, glue, stiff cardboard (8½" x 11" cardboard from back of writing tablets) or tagboard, laminating machine if available, reference materials such as a dictionary or encyclopedia on weather, *Storms--From the Inside Out* by Malcolm E. Weiss, basketball or globe, one activity sheet per student

Description: Have youngsters cut activity sheet into designated sixteen squares. Rearrange puzzle pieces to make complete picture. Glue pieces in place onto cardboard or tagboard. Color. Decorate. Use as back cover for Student Weather Book. Laminate. Tape back cover to front cover (activity page 1) and use as a folder for pages that make complete Student Weather Book. Youngsters can also use a 3-ring binder for this purpose. Compare geographical areas of Eastern and Western Worlds and the types of wind and weather patterns found in each. Note date completed and save for future reference.

Answers: Completed project looks like this:



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